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Simulation for Factory Acceptance Testing and Operator Training

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Presenters

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Soda Springs, Idaho

Monsanto, Soda Springs, Idaho



- Elemental Phosphorus Plant
- Started in 1952
- Only elemental phosphorus plant in North and South America

Elemental Phosphorus & Products Made From It



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Soda Springs Workforce

- 386 Employees
- 32 Control operators
- Average age of the workforce – 45
- Employees eligible to retire in 2009 – 20%
- Employees eligible to retire within 5 years – 33%

Workshop Objectives

- Process Simulation
 - Why was simulation necessary?
 - Goals and expectations
 - Implementation method
 - Factory Acceptance Testing
 - Operator Training
 - Results

Why Was Simulation Necessary?

- Provox to DeltaV Conversion
 - Systems To Be Converted
 - OWP to DVOP
 - Provox to DeltaV controllers
 - Timeline
 - 2004 – DVOP and one controller
 - 2005 – one controller
 - 2006 – three controllers
 - 2007 – two controllers
 - 2009 – one controller
- Operator Training
 - Operators competent with the DeltaV system

Goals and Expectations

- Provox to DeltaV Conversion
 - Offsite verification of database, displays and control logic
 - System reviewed by engineers, operators and trainer
 - Gain operator input and buy-in
 - Smooth onsite system cutover

- Operator Training
 - Simulation for operator training prior to system cutover
 - System that duplicates the live process and capable of producing failure scenarios
 - Separate training system for each operator
 - Simulation for ongoing refresher training

Implementation Method

- System configuration handled by an offsite Emerson representative
- Factory Acceptance Testing performed at the Emerson site
- Simulation setup at the plant
- Monsanto onsite operator training conducted
- DeltaV conversion implemented

Factory Acceptance Testing using Simulation

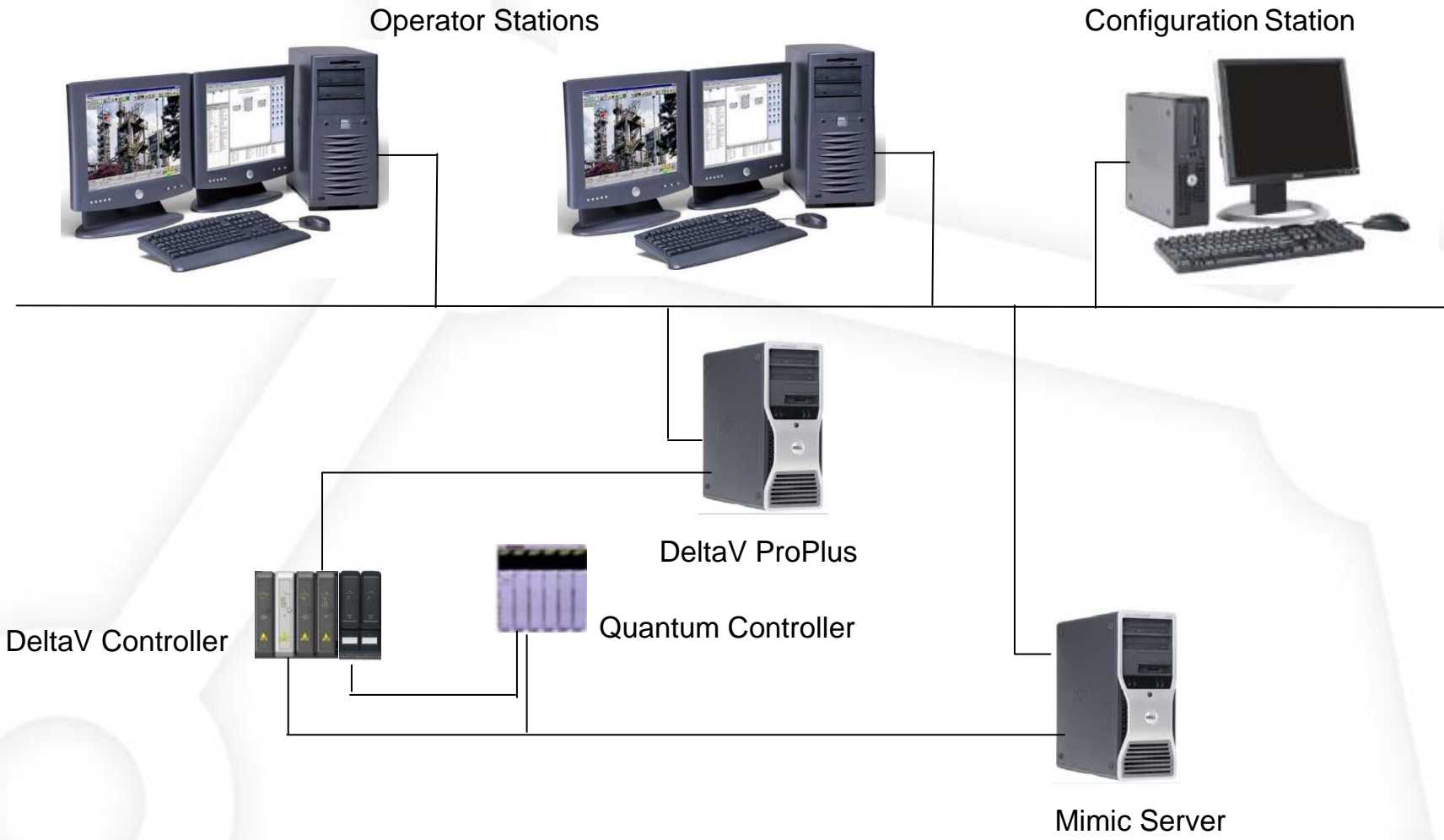


Operator Consensus

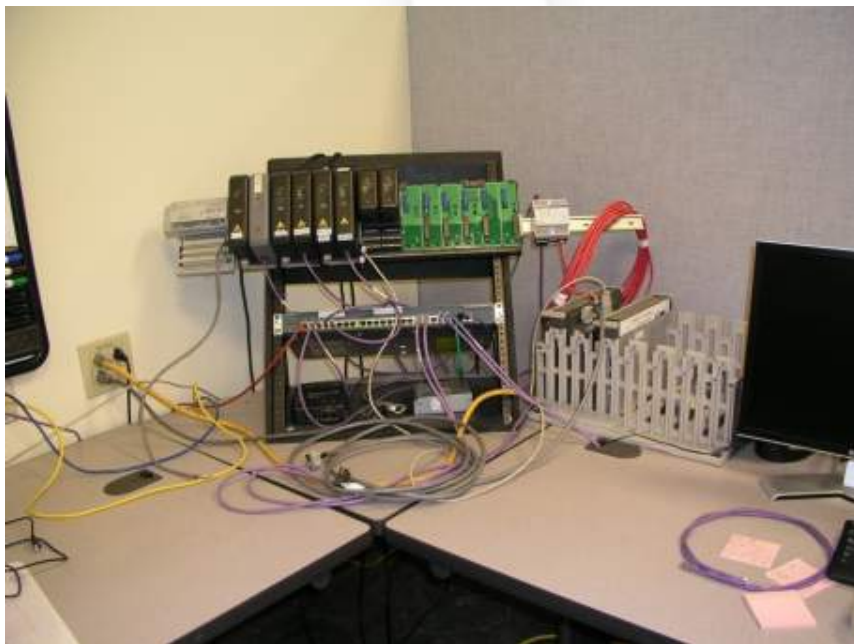


Engineer Verification

FAT Offsite Hardware Setup



FAT Offsite Hardware Setup



DeltaV and PLC



DeltaV VIM, Controller

Factory Acceptance Testing Results

■ Pros

- System provided the feel and operation of a live system
- Complete system verification
- Interaction between Monsanto engineers and operators, Emerson engineer
- Control operators were able confer to and agree to necessary changes
- Final modifications made prior to onsite implementation

■ Cons

- Manpower
- Costs

Operator Training with Simulation



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Plant Hardware Setup Operator Training

Location: Central Plant Training Room



Remote Training PC

Connect via Remote Desktop



DeltaV SimulatePro



DeltaV SimulatePro



DeltaV SimulatePro



DeltaV SimulatePro

Workgroup



DeltaV SimulatePro



DeltaV SimulatePro



Mimic Server

Location: Main Building Server Room

Plant Server Setup



Dell 2950 Servers

- One Mimic Server
- Six DeltaV SimulatePro Servers

Operator Training

- Training / Simulation Development
 - Simulation setup using Emerson configuration
 - Modification due to OPC vs VIM
 - Programmed failure scenarios

Operator Training

■ Pros

- Head start on training material/work instruction development
- Simulate actual Soda Springs plant process
- Create failure scenarios without impacting the live process
- Operator familiarity with the displays, process and operation
- Enhance the adult learning process
- Reduce classroom training time
- Will use simulation for new operator and refresher training

■ Cons

- Initial setup
- Keep the database current

Operator Training

- Future Plans

- More process simulation
- Streamline updates to the simulation systems
- Simulate new processes prior to implementation
- Utilize Mimic Operator Training Manager

Summary

- Simulation successfully used for both FAT and Operator Training
- Configuration verified prior to in-plant implementation
- Operators confident and familiar with the system prior to implementation
- Simulation will continue to be used for future training

Questions?



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Where To Get More Information

- MYNAH Technologies
 - <http://www.mynah.com/mimic>
- Emerson Process Management
 - http://www.easydeltav.com/pd/PDS_Simulate.pdf
- Technology Exhibits